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Ramifications of Technology for Current Surveys

Preliminary Report of the Working Group

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Ramifications of Technology for Current Surveys

I. Background

Widespread use of computer and telecommunications-based technologies to deliver instruction and provide access to information resources has the potential to change postsecondary education significantly--its organizational relationships, financial operations, student participation patterns, and faculty roles and responsibilities. Technology will result in the removal of time constraints--instruction will be available when the learner wants it; and place constraints--instruction will available at a virtually unlimited number of locations. Technology will open a wider range of student choices resulting in a transformation from an institutional-centered context for the delivery of instruction to a learner-centered emphasis. There will be greater competition and specialization across a wider range of educational providers, but at the same time a greater need for providers to cooperate and share resources.

These developments will have far-reaching ramifications for policy development in postsecondary education, and for the data that are needed to support policy analyses. New measures will need to be incorporated into postsecondary education data systems that reflect the changes being brought about through the expanded use of technology-based instructional delivery systems.

Against this backdrop, on August 4 and 5, 1997 the National Postsecondary Education Cooperative (NPEC) co-sponsored a Policy Panel with The George Washington University to examine how technology might affect the utility of data systems for policy development, implementation and evaluation at all levels within postsecondary education.

The Policy Panel focused on six major questions: (1) In what directions are technology developments in postsecondary education headed and what are their policy implications? (2) What kinds of new institutional and programmatic configurations are likely to emerge as a result of the adoption of technology? (3) What effects will technology have on faculty roles and work? (4) How will student participation patterns be analyzed? (5) How will student progress and learning gains be assessed? and (6) In what ways will technology change revenue and expenditure flows?

The deliberations of the Policy Panel reinforced the urgency of the challenges related to expanded use of technology in postsecondary education and their implications for policy analyses and data requirements. In January 1998, the NPEC Steering Committee appointed a Working Group to examine the data ramifications of technology for current surveys. This is the preliminary report of the Working Group.

II. The Components of Learning

The Working Group did not approach its task by focusing first and directly on the “data ramifications of technology.” Rather, the Working Group concluded that it was important to construct an overall conceptual description of the learning process, and then to examine the implications of technology in this larger context.

In developing this overarching conceptual framework, the Working Group defined *learning* very broadly to mean *any advancement in skills or knowledge*. A learning experience can involve an individual learner working independently with learning providers, or it can simultaneously involve multiple learners as well as multiple and different types of providers. For example, instruction could be delivered via the internet, employing interactive multi-media learning materials developed by a commercial vendor (provider 1); facilitated by a faculty member from a university that sponsors the course or module (provider 2); with learning results assessed via a standardized test administered by a testing service (provider 3); and credit awarded by the different colleges and universities whose students are availing themselves of the learning experience (provider 4). Learning may occur simultaneously at multiple sites and in regular or asynchronous patterns. The Working Group wished to develop a conceptual framework that captured the full scope of possible learning experiences, and concluded that building upon the two basic ingredients of learning--a learner and a provider(s) of the learning experience--could accomplish this. The following broad sub-components of providers and learners shown in Table 1 below are developed in greater detail in Appendix A.

Table 1

Classification Structure Describing Learning Providers
Characteristics
Functions
Geographic (where functions are carried out)
Provider Resources
Partners
Outcomes

Classification Structure Describing Learners
Characteristics
Participation Patterns
Geographic (where learning takes place)
Financial
Learner Resources
Outcomes

III. Examining Key Relationships Between Learners and Providers

Fully understanding the learning experience not only requires information about learners and providers as reflected in taxonomy in Appendix A; it also requires an ability to analyze the relationships between learners and providers and between the various sub-components of learners and providers. For example, Table 2 describes the relationship between provider functions and provider resources. The cells of this matrix could contain a description of these relationships in terms of a measure or analytic convention. For example, the use of faculty in curriculum development, information delivery or facilitating/tutoring could be measured in FTE. In addition to using faculty (measured in FTE), information delivery could also use technicians (measured in clock hours), technologies (measured in hours or dollars), and facilities (measured in square feet).

Table 2

Relationships Between Provider Functions and Provider Resources

Provider Resources	**Provider Functions**						
	Developing Curricula	**Delivering Information**	**Facilitating Tutoring**	**Providing Student Services**	**Admin-istering Operations**	**Assessing Learning**	**Credentialing**
Faculty							
Facilitators							
Product Developers							
Technicians							
Technology							
Licenses							
Facilities							

Many other relationships between learners and providers and the sub-components of learners and providers could be developed. In fact, any combination of the sub-components of the taxonomy shown in Appendix A could constitute a relationship that would be important to capture in postsecondary education surveys or studies. The Working Group examined these relationships in developing the priorities and recommendations related to current surveys that are reflected in the following section.

IV. Recommendations for Changes and Additions to Current Surveys

Theoretically, a relationship and associated measures and analytical conventions could be defined between any combination of the sub-components of learners and providers shown in Appendix A. However, some of these relationships will be more meaningful and useful in a policy or analytical context than others. The Working Group considered which of these relationships would be significantly affected by the widespread adoption of computer and telecommunications-based technologies. The following recommendations regarding additions and deletions to NCES studies and surveys are derived from these considerations, and are organized around the components of the taxonomies of learners and providers.

Recommendations for IPEDS

Learners-Financial-Charges (IPEDS Institutional Characteristics)

Student charges directly related to the use of technology (e.g., differential tuition or student fees) should be separately identified.

Learner-Resources-Technology (IPEDS Institutional Characteristics)

Institutions should indicate by a check-off their mandatory technology (i.e., computer) requirements at the institution, college, or department levels.

Also, institutions should indicate by a check-off if they provide discounts for students engaged in distance education.

Provider-Geography (IPEDS Enrollment)

Institutions will increasingly utilize technology to serve off-campus sites, and it will be important to have information about the numbers of students being served at different locations. It is recommended that an annual unduplicated headcount be reported in the following categories:

- On-campus
- Off-campus
  - In-state
  - Out-of-state (it would be desirable for institutions to report enrollments by state)
- Not site specific

Provider-Geography by Provider-Delivery Mode (IPEDS Enrollment)

In addition to having information about the numbers of students served by location, it will be useful to track the extent to which different technologies are being used to deliver this instruction. It is suggested that credit hours be used as the activity measure in the following matrix. The categories of technology reflected in the rows of this matrix should be given further consideration.

	On-Campus	Off Campus		
		In-State	Out-of-State	Not Site Specific
Television-Based				
Computer-Based				
Face-to-Face				

Provider-Resource-Finance-Technology (IPEDS Finance)

Expenditures associated with the use of technology should be collected within the following categories:

Infrastructure (e.g., bandwidth)
Equipment/Software (e.g., computers, routers, system software)
Student-Faculty Support (e.g., training, help-desk)
Content (e.g., courseware development or acquisition)

These categories should be further defined by examining existing surveys (particularly those being carried out by individual states). Also, further consideration should be given to how capital expenditures related to technology are reported.

Recommendations for the Adult Learner Survey

Learning Methods (Adult Learner Survey)

Data should be collected from learners about the extent to which they have access to technology and how they utilize technology; and conversely what barriers (e.g., geographic, accessibility of technology) they are encountering in gaining access to technology-based delivery systems. The sub-categories of the taxonomy related to delivery modes and delivery media need to be further developed and built into the adult learner survey.

Learner Participation Patterns-Interaction with Providers (Adult Learner Survey)

Better insights are needed regarding to the ways that learners interact with providers. Specifically, what kinds of educational services are learners receiving from what kinds of providers? What kinds of barriers are learners encountering as they attempt to "rebundle" educational experiences? The sub-categories of the taxonomy in the area of "interaction with providers" (see Appendix A) need to be further refined and built into the adult learner survey. Similarly, the extent to which learners are participating in asynchronous modes needs to be captured in the adult learner survey. This will require further definition with regard to disaggregating the modes of asynchronous participation as well as identifying the measures and analytical conventions that will be used.

Learner Outcomes in Relation to Learner Goals

Clearly it will be important to assess the value added to the learning experience as a result of technology, and to analyze the cost-effectiveness of technology-based learning. The extent to which these insights can be gained through national studies, and what mechanisms can best be used to carry out such studies, will require further

consideration. It may be possible to utilize the adult learner survey to obtain information about the extent to which goals and outcomes have been achieved from the learners' perspective.

Note: The recommended sequence of analysis in the adult learner survey is to gather information about the "learning experience," then how the learning experience is delivered, followed by the characteristics and functions of the provider.

Recommendation for the Faculty Survey

Provider-Resources-Faculty by Provider Functions (Faculty Survey)

Technology will give rise to new faculty activities (e.g., development of technology-based courseware) as well as shift the emphasis of faculty activities in traditional areas (e.g., facilitating individual student learning). The definitions of faculty activities in relation to provider functions need to be reexamined and reflected in future faculty surveys.

Recommendations for Special Studies

Provider Characteristics, Functions, and Resources

A special study should be designed to examine provider characteristics, functions and resources. This study would be designed to capture the activity and resource measures represented in Table 2 above. The following relationships would be analyzed:

Provider Characteristics and Provider Functions
Provider Functions and Provider Resources

Key questions to be addressed include: To what extent is unbundling of educational services occurring? What shifts are taking place in how human resources are being used? What roles are different kinds of providers playing in the delivery of educational services?

The sub-categories within provider characteristics, functions and resources reflected in Appendix A need to be further refined. It may be possible initially to collect some of these measures through IPEDS. However, it will be increasingly important to obtain data across these dimensions from the non-IPEDS universe.

It will also be important to obtain more specific information about Provider-Resources-Technology. A check list of technologies is needed which can be used to rank by levels of use/importance (e.g., high use, very important; low use, less important).

As wider adoption of technology occurs, it will be also be important to gain insights regarding the forces that are driving the adoption of technology (e.g., competition, increased outreach, increased access, increased quality, reduced costs, student expectations, employer expectations).

V. Next Steps

In this preliminary report, the Data Ramifications of Technology for Current Surveys Working Group has recommended a series of modifications and additions to existing studies and surveys, as well as some special studies that would provided important information related to the use of technology. In some areas, the directions recommended are straightforward and could be readily implemented. These recommendations will be forwarded to the IPEDS Review Working Groups and the technical taskforce examining changes to the Adult Education Survey. In other cases additional work needs to be done with regard to defining categories, measures and analytical conventions. In some instances, further consideration is also needed with regard to the best mechanisms for collecting the recommended information. These additional efforts can best be carried out by sub-groups of the Working Group in focused meetings during this next year. It may be advantageous to involve individuals working on the Adult Education Survey and IPEDS redesign processes in these further efforts.

Appendix A: The Components of Learning

Classification Structure Describing Learning Providers
Characteristics
Organizational Descriptors
Control (public; private, non-profit; private, for-profit)
Mission
Title IV Eligible
Carnegie Classifications
Primary PSE Mission
Primarily Non-PSE Mission (business, government, social service)
Informal
Programs (level and content (e.g., CIPS)
Accreditations
Functions
Instruction
Developing Curricula
Defining Content (level & CIPS)
Identifying Information
Organizing Content and Information (packaging courses, modules)
Developing Courseware
Developing Curricular Resources
Delivering Information
Delivery Mode
Group (including lecture, seminar, workshop)
Individualized (including tutorial, project, thesis)
Traditional Delivery Media (face-to-face contact, print, audio)
Technology-Based Delivery Media (TV-based, computer-based)
Facilitating Learning
Tutoring/Mentoring
Advising/Providing Consumer Information
Assessing
Developing Assessment Mechanisms
Credentialing
Research
Public Service
Student Support
Academic Support
Institutional Support
Operation and Maintenance of Physical Plant
Auxiliary Enterprises
Geographic (where functions are carried out)
On Campus
Off-Campus

In-State
Out-of-State (by State)
Provider Resources
Financial
Prices
Revenues and Sources
Expenditures and Objects
Expenditures for Technology
Infrastructure (e.g., bandwidth)
Equipment (e.g., computers, routers, system software)
Student Faculty Support (e.g., training, help desk)
Content (e.g., courseware)
Human Resources
Types of Human Resources
Faculty
Facilitators
Product Developers
Technicians
Characteristics of Human Resources (See Human Resource Manual)
Demographic Descriptors
Educational History
Employment History with Provider
Conditions of Employment
Assignment/Utilization Activity
Outputs
Separation
Technologies (See Delivery Media Above)
Licenses
Owned (e.g., patents)
Purchased
Facilities (See Facilities Manual)
Partners
Outcomes

Classification Structure Describing Learners
Characteristics (See Student Data Handbook)
Demographic
Learner Activity (Current and Prior)
K-12
Postsecondary
Employment
Civic
Learner Capabilities
Goals
Educational Success
Economic Success
Success in Transitions
Quality of Life
Participation Patterns
Interaction with Providers
Identification of Providers
Acquiring Information
Receiving Student Services
Receiving Advisement
Receiving Tutoring, Mentoring
Being Evaluated
Receiving Credentials
Learning Methods
Delivery Modes
Delivery Media
Timeframes/Periodicity
Synchronous (years, terms, credit hours, clock hours)
Asynchronous (modules completed, time span of learning experience)
Geographic (where learning takes place)
Financial
Charges
Financial Aid
Source of Financial Resources (e.g., personal, governmental, employer)
Learner Resources
Economic
Available Technologies
Outcomes
Basic Skills
Disciplinary Knowledge

Disciplinary Breadth/Concepts
Occupational Specific Skills
Living and Workplace Skills
Success Rates
Synchronous Retention, Success in Subsequent Learning Experiences
Asynchronous Persistence Toward Learning Goals